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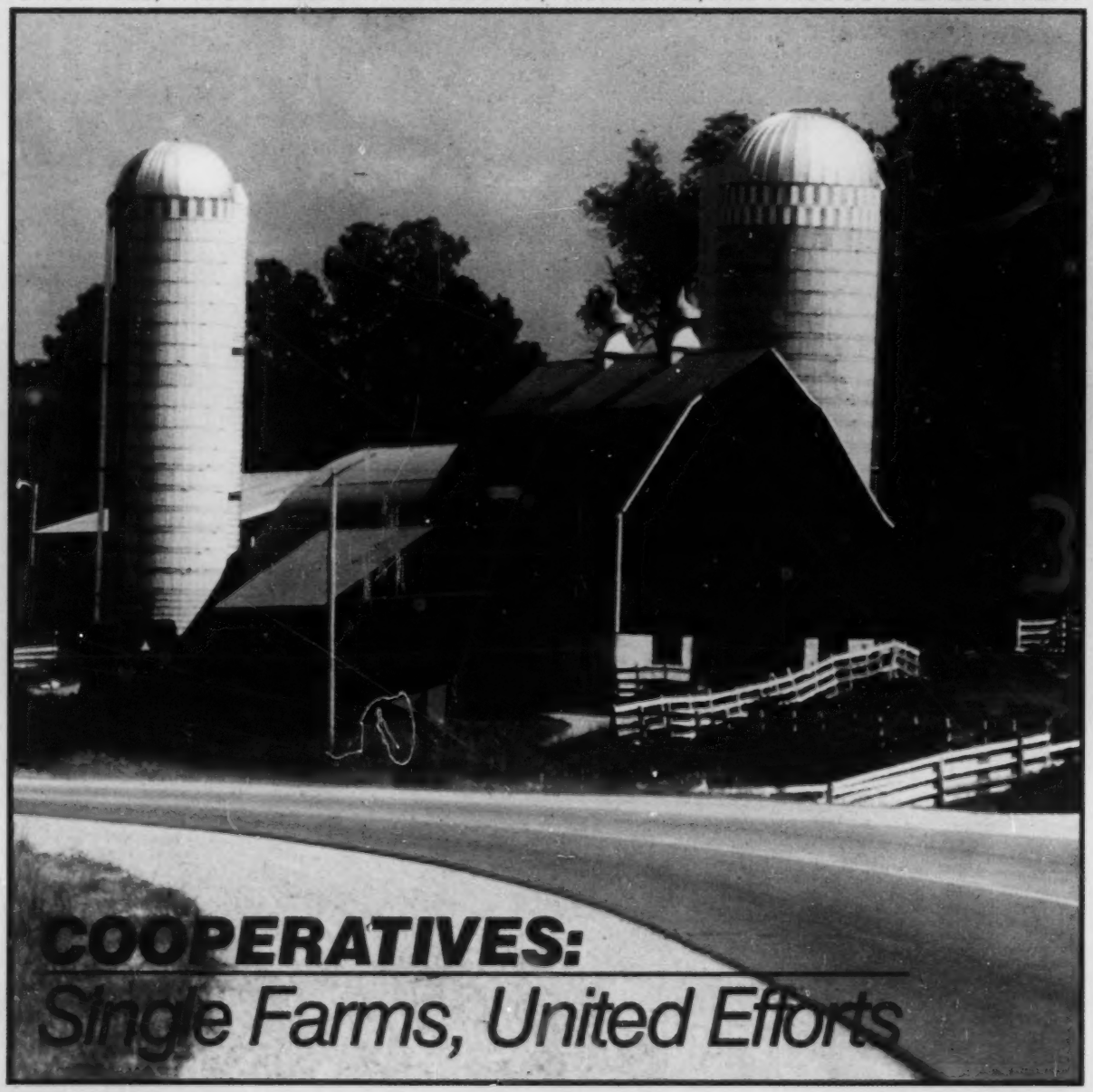

COOPERATIVES:

Single Farms, United Efforts

FOOD ENGINEERING

COVER STORY

Farmers are surviving by being members of one of more than 5,600 farmer cooperatives. Co-ops help farmers cope with over-capacity, low commodity prices, falling land values, serious credit problems and financial stress.

Photo courtesy of Associated Milk Producers Inc.

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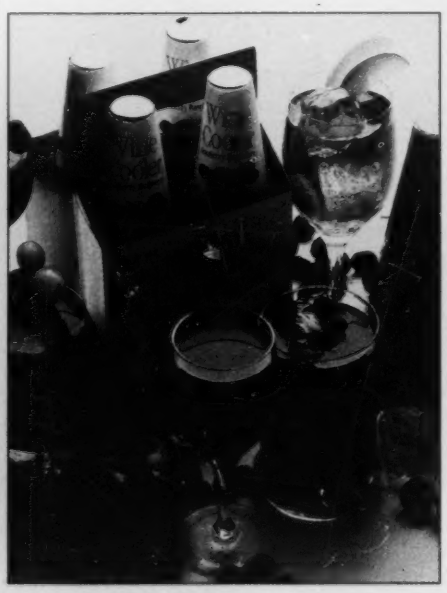

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The time has come for food companies to assess what may be the implications of AIDS for themselves, their workers, and the manufacturing process.

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Eastern Europe is an untapped market for American-style convenience foods, opening joint-venture opportunities for U.S. food processors. But prepare for the long haul, not short-term profits.

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Closing and inspection systems offer speed and efficiency to the can line. But the metal can line may be affected by a new force in packaging design: plastic cans.

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Special Emphasis

CANNING MACHINERY

The advent of plastics has meant severe competition for the canning industry. But, recent trends indicate that metal can manufacturers can expect significant growth over the next decade.

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NRA predicts foodservice industry sales to top $200 billion in 1988

FOODSERVICE SALES PROJECTIONS

	1988 Estimated Sales	1987 Projected Sales	1988 Projected Sales	'85-'88 Growth Rate
Eating & drinking places	$120,026	$137,780	$147,838	7.2%
Food contractors	9,460	10,774	11,550	6.9
Lodging places	10,698	12,340	13,303	7.5
Misc. commercial	12,679	15,213	16,640	7.4
Institutional foodservice	21,025	22,277	23,145	3.2
Military foodservice	877	987	1,050	6.2
Total	**$174,766**	**$199,371**	**$213,526**	**6.9%**

(All figures are in $millions) *(Source: The National Restaurant Association)*

The NRA's foodservice sales projections are broken down by major area. Total sales are expected to top $200 billion for the first time in 1988.

National Restaurant Association President Michael Grisanti has announced that the association is forecasting $213.5 billion in total sales for foodservice in 1988. The forecast is based on predictions that national economic growth will continue the course of expansion begun in 1982. However, Grisanti cautioned that foodservice industry sales are closely tied to the welfare of the general economy.

"The significant stock market decline which occurred on October 19 and the fluctuations that have occurred in subsequent weeks certainly must be considered when evaluating the economy," said Grisanti. However, he reported that the Conference Board, a major business and consumer research organization, took a poll immediately after October 19 and found that consumer confidence in the overall economy dipped only slightly as a result of the stock market decline. "The underlying strength of the economy remains sound," said Grisanti. Because of these economic reasons, food and drink sales for the foodservice industry are projected to increase by $14.2 billion in 1988, a 7.1 percent advance.

Restaurants and lunchrooms, which account for one-third of total industry sales, are expected to post sales of $70.6 billion, up from 66.1 billion in 1987. Limited menu restaurants (primarily fast food), will continue to outpace industry-wide growth, with sales projected to reach $60.4 billion for an 8.5 percent increase. Bars and taverns should see a sales advance of 4.5 percent in 1988, to $9.6 billion. Sales at lodging places should reach $13.3 billion for a 7.8 percent increase.

Menu prices are expected to advance 4.2 percent in 1988, slightly below the projected rate of increase for the Consumer Price Index, primarily because of low projected increases in wholesale food prices (1.6 percent). Industry labor costs are forecast to advance 4.0 percent in 1988, following a 3.6 percent rise in 1987. Low unemployment rates, combined with a continuing decline in the number of teenagers in the labor force should exert upward pressure on wages.

According to Grisanti, continued foodservice industry growth is a result of focusing on long term trends as opposed to short term fads. "Adaptation to consumer demand," said Grisanti, "is the reason why we will top 200 billion dollars in 1988 sales."

New name is sought for 'aseptic' technology

The National Food Processors Association's Aseptic Affairs Committee is sponsoring a contest to develop a new term to describe "aseptic" processing and packaging. The contest is intended to uncover a new name that will more attractively and accurately communicate the attributes of aseptics. Savings bonds will be awarded to the top five recommendations.

Submissions are due by February 1 to NFPA, 1401 New York Ave., N.W., Washington, DC 20005. For more information call Ellen Morton or Dorsey Davidge of NFPA at (202) 639-5900.

Circle 25 or see FEM, p. 95

Fierce competition ahead for low-calorie...

Sweeteners

The future of low calorie sweeteners in the U.S. and abroad was analyzed at the Calorie Control Council's last annual meeting.

As the U.S. FDA evaluates food additive petitions for four new low-calorie sweeteners, toxicology work is underway on several other sweeteners with hopes of submitting petitions for them by 1990. And sophisticated research is aimed at developing even more low-calorie sweeteners.

At the Calorie Control Council's (CCC) annual meeting, held last October, reports were given on new sweetener research and international sweetener regulations. But as more sweeteners are on the horizon awaiting approval, Raymond Gill, Deputy Director of the Office of Compliance, FDA, pointed out that the public is demanding higher standards of safety.

Aspartame: Dr. Sam Molinary, Vice President, Regulatory Affairs, The NutraSweet Company, spoke about the lessons learned in seeking, obtaining, and maintaining worldwide approvals. **Circle 250**

"If you plan to file an additive petition, make sure the scientific data is sound, and make sure the user industry is behind you," Molinary stressed.

Saccharin: Dr. James Emerson, Director, External Technical Affairs, The Coca-Cola Company, said that while a lot of theories exist on how saccharin acts in the body, there is very little proof for any of them. Ongoing research continues to examine saccharin's effect in the body.

Cyclamate: William T. Miller, Vice President, Royal Crown Cola Co., gave the regulatory history (*see Food Engineering, November 1985, p.67*). Miller announced that by November, 1987, all the studies requested by FDA in connection with the petition submitted by Abbott Laboratories and the CCC requesting approval of cyclamate usage in the U.S. will be completed.

Miller concluded by saying that cyclamates are valuable because of their taste, stability, and cost.

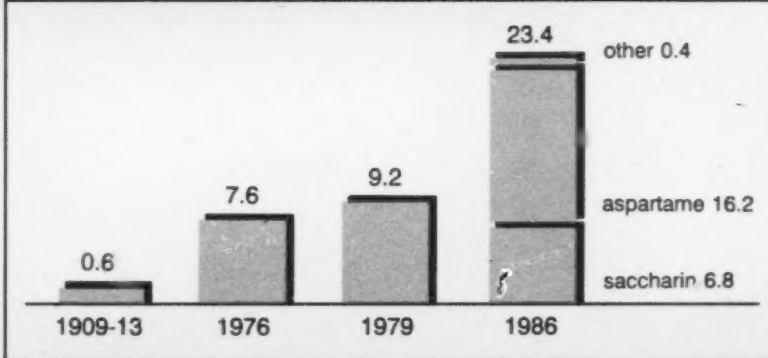
PS-99 and PS-100: Dr. Robert G. Bost, Director, Sweetener Development Program, General Foods Corp., announced the development of two high-intensity sweeteners. About five years ago, GF launched a research program to look at the mechanisms of sweeteners. PS-99 (1,800 times sweeter than sucrose) and PS-100 (2,200 times sweeter than sucrose) are the result of that program.

The preliminary toxicology work on these sweeteners looks promising, Bost said. Future plans involve finding a manufacturing partner and focusing efforts on process development. Approval for PS-99 and PS-100 is expected in four to six years.

Acesulfame-K: Business Development Manager, Hoechst Celanese Corp., Karl H. Gruettemann, spoke about acesulfame-K, which is currently approved in 18 countries. And so far there have been no adverse reports on its safety, Gruettemann reported.

Gruettemann said that he had recently seen a draft regulation allowing the use of acesulfame-K in this country. The manufacturer plans on following up with additional usage petitions requesting the sweetener's use in products such as liquid juice and baked goods. The current cost of acesulfame-K in Europe is $35 to $40 per pound at introductory quantities.

High Intensity & Non-Caloric Sweeteners (sucrose equivalent sweetness) (grams per capita per day)



Source: Public Policy Forecasting, Inc. — Graham T.T. Molitor, 1987

Sweetener (U.S. marketer/developer)	**Description**	**Current legal status**
Aspartame The NutraSweet Co. Skokie, IL	A low-calorie nutritive sweetener which is approximately 180 times sweeter than sucrose. It is a methyl ester of two amino acids – phenylalanine and aspartic acid (aspartate).	FDA approval for limited applications granted in October, 1981. Since than other uses have been approved such as its use in beverages.
Saccharin	A non-caloric sweetener approximately 300 times sweeter than sucrose. It is derived from purified methyl anthranilate.	From 1969 to 1981, saccharin was the only synthetic sweetener approved for use in the U.S. In 1977, FDA proposed prohibiting its use but, as a result of public outcry against the proposed ban, the U.S. Congress declared a moratorium on its ban. It is currently approved for use in more than 80 countries worldwide.
Cyclamate Abbott Laboratories Abbott Park, IL	A non-calorie sweetener, approximately 30 times sweeter than sucrose.	Withdrawn from U.S. market because of FDA ban in 1969. Abbott Labs and CCC filed new petition in 1982. By November 1987 all additional studies requested by FDA were submitted. Permitted for use in 40 countries, including Canada.
Acesulfame-K (ACK) American Hoechst Corp. Somerville, NJ	A high-intensity, non-caloric sweetener which is approximately 200 times sweeter than sucrose.	FDA has been reviewing a petition since 1982. ACK is approved for food use in 17 countries including the U.K., Switzerland, West Germany, and Australia. Endorsed by WHO in 1983 and EEC Scientific Committee for Food in 1985.
Sucralose McNeil Specialty Products Co.	Made from sucrose with three -OH groups replaced with -Cl molecules. It is non-caloric and 600 times sweeter than sucrose.	Food additive petitions submitted in U.S., U.K., and Canada in 1987.
L-Sugars The Lev-O-Cal Co. Rockville, MD	Has different orientation of various atomic groups on carbohydrates – such as fructose – to form mirror images. Has identical chemical and physical characteristics but isn't absorbed by the body.	Long-term testing program for safety and efficiency remains to be done. Expect toxicology testing to be finished in 1990.
Derivatives of Thaumatin INGENE, CA	A natural protein (medium size), 400 times sweeter than sucrose which is produced by fermentation.	Working on Toxicological studies, hope to file food additive petition in 1989.
Alitame Pfizer, Inc. New York, NY	A dipeptide ester consisting of L-aspartic acid and D-alanine. It is approximately 2,000 times sweeter than sucrose.	Filed petition with FDA in August 1986.
PS-99, PS-100 General Foods Corp. White Plains, NY	PS-99 and PS-100 are high intensity sweeteners which are 1,800 and 2,200 times sweeter than sucrose. Developed through computer modeling.	Just beginning toxicological tests, hoping for approval in four to six years.

Acesulfame-K has a high degree of stability both at low pH and when exposed to high heat, according to Gruettemann. He also noted that it has a synergism effect when blended with aspartame.

Sucralose: Franta J. Broulik, Senior Manager, Regulatory Affairs, McNeil Specialty Products Company, explained that sucralose is made from sucrose, with three -OH groups being replaced with three -Cl atoms. It is 600 times sweeter than sucrose.

Food additive petitions for sucralose were submitted in 1987 in the U.S., the U.K., and in Canada. Tate & Lyle Speciality Sweeteners, an English company, will market sucralose in Europe, Africa, Canada, and the Far East. The marketing of sucralose in all other countries will be handled by McNeil Specialty Products, a division of Johnson & Johnson Co.

L-Sugars: Eduardo Squillace, Chairman, Lev-O-Cal Company, described L-Sugars as identical to sucrose or other sugars except they have a different orientation of various atomic groups to form a mirror image. This gives the same chemical and physical characteristics to the sugars they mirror except they are not absorbed by the body.

Currently, the toxicological testing for L-sugars is underway. It is expected to be completed by 1990 and a petition filed by 1991. Research is being supported by Biospherics Lab, Beltsville, MD, and several Italian companies – Eridanioa, Genova, Italy, and Montedison, Milan, Italy.

Derivatives of Thaumatin: Dr. Gary Wilcox, President and CEO, INGENE, told of a new genetically engineered manufacturing process to produce thaumatin by fermentation. Thaumatin, a natural protein which is 400 times sweeter than sucrose, is isolated from an African plant and used as a flavor enhancer in England.

Beatrice, which is sponsoring the research, is now conducting taste tests. Toxicological studies are underway and INGENE hopes to file for approval by 1989.

Alitame: Dr. Leonard Czuba, Director, Safety and Regulatory Affairs, Pfizer, Inc., said that the review process for alitame (Pfizer filed a petition for alitame in August, 1986) is proceeding well, but he was not prepared to say when approval was expected.

Alitame is 2,000 times sweeter than sucrose and exhibits excellent stability, according to Czuba.

"Satisfying the taste for things sweet and bereft of unneeded calories, calorie-controlled sweeteners will account for over 50 percent of all sweetener use beyond the turn of the century," summarized Graham T. Molitor, President, Public Policy Forecasting, Inc. "Consumers, the majority of whom already are obese or overweight, will hasten the disfavor and decline of caloric sweeteners."

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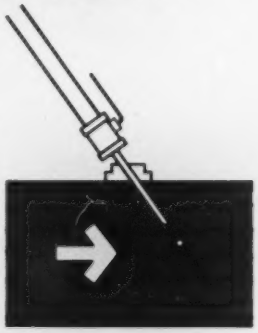

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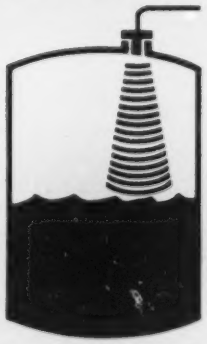

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Ocean Spray Cranberries is a prime example of co-op success: Sales and return to owners have increased for 12 years in a row.

THE CO-OP STRATEGY

The last several years have been difficult ones for U.S. farmers. You need only look at television news, or read the newspaper to know that being a farmer today is more than planting crops or milking cows, it's learning how to survive in an economic environment rife with competition—both here and abroad.

Farmers in a global market

"We are living in a world becoming increasingly more abundant in global supply, without a substantive increase in consumers," says William F. Allewelt, Jr., president, Sun-Diamond Growers of California. "There is more product available for a relatively finite block of consumers," he says.

The way a lot of today's farmers have found to survive in agriculture is by being members of one of more than 5,600 farmer cooperatives. Farmer-owned cooperatives are performing the vital functions today of helping cope with over-capacity, low commodity prices, falling land values, serious credit problems and financial stress.

Co-ops are responding to some of these problems in a manner common to today's industry: mergers, acquisitions, joint ventures, streamlining of operations, staff reductions, elimination of unprofitable product lines, and greater attention to world markets.

"Cooperatives have gone ahead and made the necessary adjustments," says Wayne Boutwell, president of the National Council of Farmer Cooperatives. "They have lowered costs, lowered personnel. They have done well responding to a down situation ... they have positioned themselves well." In fact, says Boutwell, "Proprietary companies could learn from cooperatives."

Co-ops are big business

"We are no different from Nabisco or

LINDA K. FREEMAN
Contributing Editor

COOPERATIVES

The last few years haven't been easy ones for U.S. farmers. The way some have survived and prospered is almost as old as the ag industry itself: Co-ops.

Campbell Soup," said one co-op executive talking about their operations. And that's true, to some extent.

A co-op is a business enterprise formed to achieve certain goals: improving market position, increasing income, and maximizing operating efficiency. In order for a co-op to be successful in achieving those goals, it must be a successfully operated business.

To do that, co-ops operate like other food industry businesses. They are carefully managed and operations are carefully coordinated. Research and development work is done in concert with sales and marketing. Manufacturing operations are coordinated with sales. As with all major industrial operations, communication between departments and areas of operation are vital.

But there are some real differences, both in operation and in attitude.

"In a proprietary company," says John Lawlor, manager of communications at Ocean Spray Cranberries, "if things are down, you simply stop buying raw material. You don't have that option with a co-op, so it forces us to think about businesses which can consume a growing crop over time and put those in place so that we are ready to go when the crop expands. A proprietary company doesn't have that urgency ... they cut back."

A different attitude

Co-ops also differ from proprietary companies in their corporate attitudes. "In a co-op," says Lawlor, "there is a strong sense of ownership and sense of product that you don't get with a proprietary company. It is their family and their livelihood, so it is important to them."

But that can be a curse as well as a plus. It is difficult, especially in a depressed agricultural economy, for some co-op members to see beyond the boundaries of their own fields. They have difficulty looking at the overall operation of the co-op and its long-term goals when they see declining prices and product surpluses.

Diminishing price supports

A perfect example is the situation facing the dairy farmers today. For years there has been over-production of raw milk. Farmers have been helped by price supports through federal legislation. (When more than 5 billion pounds of raw milk is produced, the price support program goes into effect.) Under the current budget reform taking place in Washington, however, it is possible that dairy farmers will lose $1.50 in price supports over a two-year period, bringing the price down to below $9.00 per 100 pounds of fluid milk. That money, says Irwin Elkin, president of the Associated Milk Producers, "comes off the farmer's income."

It is easy in good times for co-op owner-members to support expansion or modernization programs, increases in advertising budgets, and capital expenditures. But when faced with a cut in income, it makes it difficult for the farmer to support such actions. This can carry over to lack of support for some of the projects and programs the co-op's management team wants to enact – programs and capital expenditures must be approved by the Board of Directors comprised of owner-members.

One co-op executive described co-op approval channels as "slower and more tedious than private business," and there is definitely a tendency for regional problems to directly affect the decision-making process at the

board level. Different regions sometimes have different philosophies and different problems facing them. Resolving these conflicts, while doing what is best for the co-op, is not an easy task, and at times not one quickly accomplished.

The supply co-operative

Land O'Lakes, Inc., Minneapolis, MN, with 600,000 farmer-members (mostly grain and livestock), is a unique representative of how a co-op functions. Land O'Lakes is an ag-supply co-op as well as providing food processing and marketing functions for its member-users.

The farmer-members belong to 1,500 local cooperatives which supply them with a wide variety of agricultural inputs and services.

In addition, there are 10,000 voting units (dairy and turkey farmers, direct owners of the co-op, whose products feed the processing operations of the co-op). The 1,500 locals and the voting units are divided into 18 districts, each of which sends two members to the Board of Directors. The Board selects the President of the organization to run the day-to-day operations, while the Board formulates the policies by which the co-op functions making "each farmer-member an owner," says Terry Nagle, Land O'Lakes' director of communications.

In 1986 Land O'Lakes reaped total sales of $2.2 billion from ag-supply and food processing. More than 600 different food items are sold to consumer, foodservice and industrial markets across the country. An international division markets products in more than 20 countries.

Consolidation is key

How is Land O'Lakes staying competitive with an acknowledged over-supply of milk? "We are in a consolidating mode," says Nagle, "to reduce costs and market more effectively." Indicative of this are two joint ventures, one with CENEX to consolidate ag service operations and another with Mid-America Dairymen, which is a limited milk processing and whey marketing venture.

The joint venture with CENEX has proven a stroke of genius. Says Ralph Hofstadt, president of Land O'Lakes: "We thought we would save $10 million—and it will be $11 million actually. We are saving $5-6 million in administrative costs. By the end of 1989 we could put $20 million on the bottom line."

Aggressive management

Ocean Spray Cranberries, Inc., Plymouth, MA, is another highly successful co-op. The key, says Jim Kirk, business operations manager, is that the co-op is aggressively managed and operated.

"This is what distinguishes Ocean Spray from other companies," says Kirk. "We have a very good balance between the ability to aggressively support an existing business, while at the same time actively pursuing new products." Proprietary companies, he says, "forget what keeps the lights burning."

The aggressive management style has paid off. For 12 years in a row they have increased sales and also the profits returned to the growers. "We expect to be a billion dollar company by 1990 and to continue to grow beyond that," says Kirk. In 1987 sales were $730 million, up from $636 million in 1986.

Ocean Spray was the first U.S. processor to market an aseptically packaged juice drink. The "Paper Bottle" line today is comprised of nine juices and juice drinks and represents sales of $35 million. Only Coca Cola Foods and General Foods top Ocean Spray in brand name juice drinks; only *Minute Maid* and *Tropicana* sell more volume.

A co-op for co-ops

Sun-Diamond Growers of California in Stockton is a co-op in operation for other co-ops. It markets and processes the crops of 5,000 direct owner-members of five commodity-based co-ops. A Fortune 500 company, in 1986 Sun-Diamond's five aggregate organizations grossed $500 million in sales.

Included in this umbrella organization are: Diamond Walnut Growers, Inc., (walnuts); Sun-Maid Growers of California, (raisins); Valley Fig Growers, (figs); *Sun-Maid* and *Sunsweet* dried fruits; and *Sunsweet* prunes.

William F. Allewelt, Jr., president of Sun-Diamond, feels a primary plus is the brand identification that the co-op's members enjoy. This gives them strength in world markets they couldn't achieve otherwise.

Another plus: "There is no primary tax on the corporate activity," of a co-op, says Allewelt, "like there is on the for-profit companies because profits go back in proportionate shares to the owner-members."

There are some disadvantages, however, the primary being, according to Allewelt, that "whereas the conventional publicly-owned company has a mission to operate for an acceptable return on capital to its investors, the prime idea for a cooperative is to perform a service for its members. From time to time the issue of performing the service versus operating for optimum profitability may be in conflict." And sometimes

Ocean Spray scored a first in 1981 by being the first in the U.S. to add the aseptically packaged "paper bottle" to its juice line. Today, sales of that line are $35 million.

By consolidating hauling routes the Morning Glory Region of AMPI expects to save $3 million in hauling costs.

At Sunkist, citrus is run through a computerized electronic sizer prior to packing for shipment. The co-ops trademark is known throughout the world and is considered their most valuable asset.

O-At-Ka performs a vital balancing function for three owner-cooperatives. Taking fluid supplies from the three dairy co-ops, they process their own line of dairy products.

Riceland's international marketing has added substantially to their profitability. Here a ship is loaded with whole grain for export.

growers tend to look at a situation from the perspective of how it will affect them as an individual, rather than how it will affect the co-op as a whole.

Hard times for dairies

One area of agriculture where co-ops have definitely been able to make a difference is to the dairy farmers of the U.S. Seventy-five percent of the milk produced in the U.S. is marketed through cooperatives.

Associated Milk Producers, Inc. (AMPI), headquartered in San Antonio, TX, represents 25,000 member farms in 21 states across the midwest, south and southwest who produce about 12 percent of the U.S. milk supply. AMPI's vast operations are divided into three separate regions each operating autonomously.

At AMPI company management feels that "consolidation of resources ultimately is the key to survival—survival of the family dairy farm and survival of a strong cooperative system that provides needed support functions."

The Morning Glory Region is a one-year old merger of AMPI's Mid-States Region and Morning Glory Farms Cooperative, a 2,000 member co-op in Wisconsin. One of the most significant aspects of the merger, says Ken McKenzie of Morning Glory, was the consolidation of milk hauling routes. "Now," he says, "instead of trucks criss-crossing each day they are more efficiently routed" and there are fewer trucks on the road. It was estimated that $3 million could be saved in merging the hauling functions.

Membership in AMPI makes available such corporate America-type services as self-funded group health care trusts, and disaster benefits. "Sometimes the price we pay for the milk is not as competitive as they could get elsewhere," says McKenzie, "but they stay in the co-op to get the health plan."

Even with its leadership position in size, sales (expected to be $2.7 in 1987), and production (17 billion pounds of milk each year), AMPI is not immune to the problems facing dairy farmers. Three more price support cuts are expected by January 1989, each in the amount of 50 cents. Every time the price support is cut, dairy farmers strive to produce more to make up for the financial shortfall. This only complicates the oversupply problem. It's a difficult, seemingly ceaseless cycle.

"There are only two ways of dealing with over-abundance," says Irwin Elkin, president of AMPI, "and they are cutting price and orderly supply management." Supply management is a concept that is ever-so-slowly gaining acceptance. This would coordinate dairy product supplies nationwide to avoid large oversupplies and to balance supply more efficiently with demand. It has been shown, says Elkin, that price alone will not solve the problem. "We need something in place on a standby supply mechanism...when the problem is there, it works. When the problem isn't there, it goes away."

Right now, however, the "various parts of the country can't agree," he says. "But," cautions Jim McKenzie, "we are all in the same market."

A co-op-owned co-op

O-At-Ka, a Batavia, NY co-op, performs a balancing function for three dairy co-ops—Upstate Milk, Dairylea and Niagara Cooperatives—all involved in bottling and dairy processing.

O-At-Ka's primary function is to provide a place and use for milk not being used by the three member co-ops in their bottling or processing operations. By accepting excess fluid supplies, O-At-Ka can perform its second function: production and marketing of dairy products.

In 1986 the co-op had sales of $135 million; in 1987 they expect sales of $87 million, reflecting a 26 percent decrease in raw milk supply from their three members. Why? "We are limited on raw ingredients and when there is heavier demand by the cheese industry, which there has been, it affects the amount of milk coming into our co-op," says Jim Westwick, marketing manager.

Yet, O-At-Ka provides a vital function: balancing the raw fluid supplies of three other co-ops so the best and most profitable use can be made of available product. This has allowed the three parent-co-ops to be stronger, and thereby made the farmer-owners of those co-ops stronger.

International marketing

Sunkist Growers, Sherman Oaks, CA, is a marketing co-op representing nearly 6,000 growers of citrus fruit throughout California and Arizona.

The major portion of their business is in fresh fruit, which accounts for 75 percent of their gross revenue ($825 million for fiscal year 1987). Close to 75 million 40 pound containers of citrus were sold. The remaining 25 percent, or about 650,000 tons, was processed into various products. In all, 400 different products are sold in 40 different countries under the Sunkist name.

Kurt Anderson, vice president, public relations and grower relations, says "our cooperative is strong because we have a good trademark, are well capitalized and have a good sales network."

International sales are important to their operation. In 1986 alone, Sunkist accounted for 65 percent of the total oranges shipped to Japan under an agreement between the industry, the U.S. government and Japan. Strong returns have been realized in Hong Kong, Singapore, New Zealand, Australia and Malaysia.

Grower-driven organization

"We are a grower-driven organization working to find better markets" for the members of the California Almond Growers Exchange (CAGE), says Steven Easter, vice president, member and government relations. This 5,300-member co-op in Sacramento, CA, markets under the name *Blue Diamond*, easily recognizable in its effective advertising campaign featuring actual grower-members.

"Together our grower-members have strength," says Easter. With the co-op "they have someone to look after the marketing on their behalf that has their interests and *only* their interests at heart. There is no motive to make a profit other than for the grower."

CAGE is considered by many in the agricultural field to be one of the most skillful marketers in the industry. Proof: Today almond consumption has grown to in excess of 750 million shelled pounds, up from 450 million just five years ago. Deliveries to domestic customers were up for the fifth year in a row, reflecting an increase in domestic consumption of nearly 58 percent in the last five years. Net sales for the fiscal year were $425

TOP 50 AGRICULTURAL COOPERATIVES – 1986

RANK	COOPERATIVE	TOTAL SALES	NET MARGINS
1	Agway, Inc.	$3,510,506,000	13,978,000
2	Farmland Industries, Inc.	2,700,000,000	(152,200,000)
3	Associated Milk Producers	2,535,873,000	3,703,000
4	Land O'Lakes, Inc.	2,215,123,000	10,542,000
5	Harvest States Cooperatives	1,837,081,075	4,838,496
6	Gold Kist Inc.	1,432,997,000	*
7	Mid-America Dairymen, Inc.	1,420,321,000	8,015,000
8	CENEX	1,093,180,940	(12,060,926)
9	Dairymen, Inc.	987,039,000	8,660,000
10	Indiana Farm Bureau Co-op	892,453,000	1,765,000
11	Countrymark, Inc.	834,278,023	557,650
12	Sunkist Growers, Inc.	831,320,000	*
13	Milk Marketing, Inc.	816,384,000	285,670
14	GROWMARK, Inc.	781,407,000	11,836,000
15	CF Industries, Inc.	766,139,000	(42,778,000)
16	National Cooperative Refinery	715,874,418	(42,685,832)
17	Southern States Cooperatives	645,694,101	13,043,805
18	Tri/Valley Growers	644,000,000	(1,300,000)
19	Ocean Spray Cranberries, Inc.	635,758,000	*
20	Ag Processing, Inc.	625,404,000	2,016,000
21	Northwest Dairymen's Assn.	615,357,000	17,712,189
22	Calcot, Ltd.	569,847,364	*
23	Union Equity Cooperative Exch.	568,425,840	14,001,335
24	Riceland Foods, Inc.	532,300,000	*
25	California & Hawaiian Sugar	526,255,000	*
26	Sun-Diamond Growers of CA	496,360,000	*
27	Wisconsin Dairies Cooperative	461,778,000	7,726,000
28	Western Dairymen Cooperative	446,744,804	(2,182,800)
29	Michigan Milk Producers Assn.	432,235,000	2,610,000
30	CA Almond Growers Exchange	418,347,000	567,746
31	MFA, Inc.	398,456,206	2,296,000
32	Prairie Farm Dairy, Inc.	391,000,000	15,247,300
33	Agri-Mark, Inc.	381,007,345	5,298,994
34	American Crystal Sugar Co.	354,397,000	*
35	Dairylea Cooperative, Inc.	342,162,898	*
36	Eastern Milk Producers	309,212,677	232,943
37	Citrus World, Inc.	285,387,000	*
38	Maryland & Virginia Milk Producers Cooperative Assn.	280,412,000	4,546,551
39	National Grape Co-op Assn.	269,082,000	*
40	Tennessee Farmers Cooperative	240,000,000	5,900,000
41	Norbest, Inc.	232,041,939	*
42	Universal Cooperatives, Inc.	228,827,000	1,906,000
43	Mississippi Chemical Corp.	226,270,000	(12,570,000)
44	Swiss Valley Farms Co.	216,571,152	1,825,287
45	Upstate Milk Cooperatives	216,000,000	7,800,000
46	Tree Top, Inc.	192,406,000	1,658,000
47	MFA Oil Company	186,333,000	5,789,000
48	Knouse Foods Cooperative, Inc.	160,000,000	3,400,000
49	MFC Services	159,982,166	(4,621,333)
50	NORPAC Foods, Inc.	146,853,649	1,181,136

*Marketing cooperatives operating on a pool basis. Earning figures comparable to the other cooperatives are not available.

Source: National Cooperative Business Association, "Cooperative Business Journal," Oct. 1987, page 11.

FARMER COOPERATIVE NUMBERS AND MEMBERSHIPS, 1986

Component	Cooperatives Number	Memberships Number
Products marketed:		
Cotton	396	94,749
Dairy	345	152,881
Fruits & vegetables	344	61,880
Grain and soybeans	1,514	909,643
Livestock, wool & poultry	469	450,120
Rice	49	20,600
Sugar products	40	8,020
Other (beans, peas, nuts, tobacco & miscellaneous)	103	315,031
Total farm products	3,260	2,012,924
Total farm supplies	1,971	2,225,550
Total services	138	163,283
TOTAL	5,369	4,401,757

Note: Information is preliminary. Many cooperatives are multiproduct and multifunctional in operations and are classified according to predominant commodity or function indicated by business volume.

Source: "Farmer Cooperatives," October, 1987, page 6, published by the Agricultural Cooperative Service, U.S. Department of Agriculture.

million, up from $347.5 in 1985. More than half of the sales are to foreign countries.

Growth has come through finding new uses and new markets. *Blue Diamond* almonds are used in more than 2,000 different ways and sold in 88 foreign countries.

The world's largest

The Tree Top cooperative in Selah, WA, world's largest apple processing company, had retail sales of $187 million last year. Total sales by the company accounted for one-sixth of the state's $3 billion ag industry.

The crops of the more than 3,800 grower-members are processed in one of the co-ops four processing plants into a wide range of juice products, concentrates, frozen, and dried products.

John McAlister, director, public affairs, credits the success of the co-op to responsive and aggressive marketing.

But being a co-op, says McAlister and many of his co-op counterparts, "is a mixed blessing." When times are good, everything is fine. But "there is always a shortage of capital for future expansion. If we want to develop new products or build a new plant we are very limited to the amount of capital resources we can extract from the co-op," he says.

Building consumption

Riceland Foods, Inc., Stuttgart, AR, a co-op of 11,500 farmer members in Arkansas and nearby states, is the largest miller of rice in the U.S., the nation's fifth largest grain storage company and a Fortune 500 company. "Each year," says Bill Reed, vice president, corporate development, "we mill and market approximately one-half of the Arkansas rice crop, which figures to be about 20 percent of the U.S. rice crop."

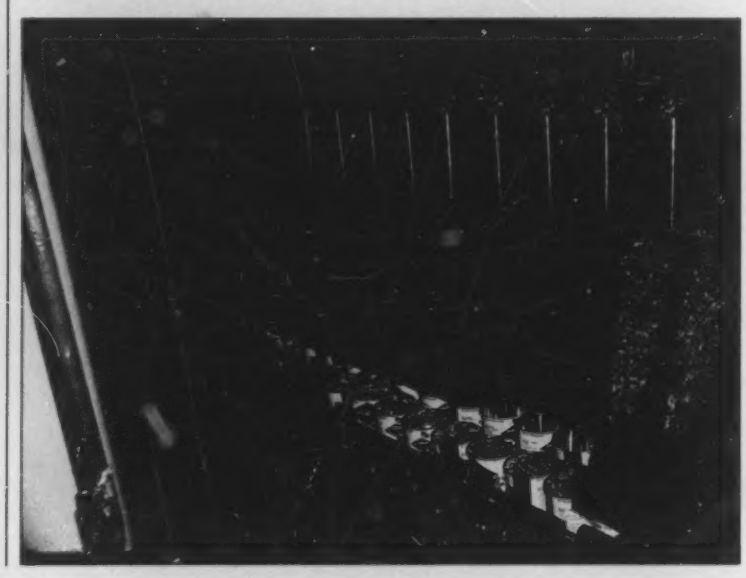
They have been leaders in what they do best: marketing rice. Per capita consumption of rice is now 17.4 pounds, up from 9.1 in 1975. By finding international markets and working with federal programs, the co-op has been able to work off their surplus. U.S. rice is now sold into roughly 75 different countries by Riceland.

Riceland also has an edible oil operation producing a wide range of soybean oil products and the co-op is one of only two manufacturers of oil-free lecithin in the U.S. Riceland products are marketed under the *Riceland* and *Chefway* names.

Looking to the future

Despite the difficulties of recent years, there is optimism heading into the 1990s. Says Ralph Hofstadt, president of Land O'Lakes, "I'm very optimistic, but only if this group of organizations can clearly see the kind of business environment they will be operating in. It will be volatile, but very exciting. We have to develop new programs and change present structures."

What the co-ops have to look forward to is continued merger, acquisition and joint venture activity. They must continue to market aggressively, both internationally and domestically. The battle for share of market will continue to be waged around the globe.



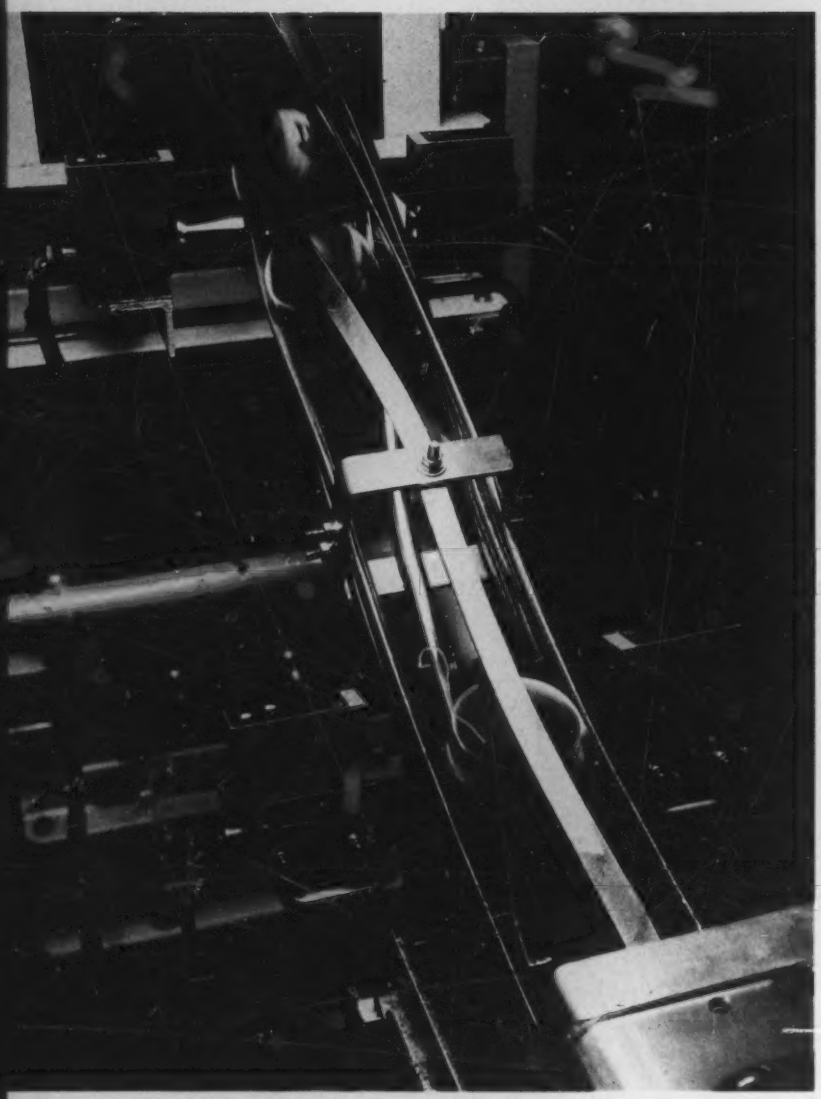
At Sun-Diamond's cannery operation, shelled walnuts are routed to cans where they are automatically filled.

Special Emphasis

CANNING MACHINERY

CANNING INDUSTRY: METAL VS. PLASTIC

Closing and inspection systems offer speed, efficiency, and product integrity to the traditional can line. But the metal can line may be affected by a new force in packaging design: plastic cans.



Photoelectric sensors from Omron Electronics monitor operations on a high-speed canning line. The sensors are able to detect jams on the line.

Canned foods and the canning industry have been around for so long that they are often taken for granted. In 1810, Nicholas Appert, a Frenchman, published the first book on canning methods and introduced a new form of food preservation. As a result, canned foods were most likely the first convenience foods.

While the advent of plastics and plastic cans is beginning to mean additional competition, the metal can still has continued to maintain a strong position in the food industry, most notably in beverages.

Recent trends in fact indicate that metal can manufacturers can expect significant growth over the next decade. The amount of can sales to major end-group users, (excluding pet foods), according to the Can Manufacturers Institute, Washington, DC, shows that 23.4 billion units of cans were sold in 1986. In the beer and soft drink category, 72.9 billion cans were shipped to manufacturers in 1986.

The most recent estimates for 1987, according to the U.S. Industrial Outlook of the U.S. Department of Commerce, show that 27.2 billion units of metal cans were shipped to major end-group users. And, in the beer and soft drink area, 78 billion units were shipped to manufacturers during the same time period.

Canning equipment

Because the canning industry is always looking to improve processing methods and to enhance product quality, safety and efficiency, canning and seaming equipment and the inspection systems to accompany them have reached an extremely high level of speed and accuracy.

For example, Continental Container Systems, a division of Continental Can Compa-

MARGIE J. RUSSELL
Senior Associate Editor

ny, Inc., West Chicago, IL, has several lines of closing machines, the most versatile being the *2000 Series*, three basic units which can accommodate a wide range of packaging. The *2003 RCM1* three-spindle machine will close 401 through 610 diameter cans at speeds up to 300 cpm. The *2004 RCM1* four-spindle machine closes 202 through 408 diameter cans at 400 cpm. And the six-spindle *2006 RCM1*, will do 202 through 404 diameter cans at 600 cpm.

The 2000 series is designed for height changeovers that can be done in several minutes, because of a new design that provides for the support and driving of all height-change-related components directly from the machine's upper housing. This eliminates the need for sliding shaft and key fits.

Another major supplier of seaming equipment, Angelus Sanitary Can Machine Company, Los Angeles, CA, has a straight-line feed seamer, *model 61H*, that provides high-speed operation with semi-automatic lubrication to minimize downtime and maintenance costs. Cans are seamed at high speed in a six-spindle "can spin" turret. Each spindle has durable, large-diameter first and second operation seaming rolls mounted on tapered roll bearings. Seaming rolls can be individually adjusted for height and seam thickness.

A closing machine which meets the industry's needs for speed, reduced spillage and low maintenance costs has been introduced by FMC, Madera, CA, as the *FMC 952*. This model is a sixteen-spindle closer using can rotating seaming principles which means that it runs faster but at the same time, provides gentler handling of lightweight cans because of lower seaming. The 952 reduces spillage through effective can spacing of the closer infeed chain and seaming head. This allows ideal synchronization to all of the fillers and minimizes can acceleration. The machine, used mainly for beverage, closes up to 2000 cpm.

Hema International, Sandy, UT, has a vacuum seamer, *model SHV60*, which is designed for round and odd-shape containers. This is an automatic seamer which can be adapted to a particular application. The seaming head allows first and second seaming operations, and is mounted on a heavy duty, articulated arm, allowing the head to swing out of the main frame. Adjustments and changeovers are easy. The SHV60 runs at speeds of 15 to 120 cpm depending on the size of the container. In addition, Hema is developing a new model which will allow speeds up to 200 cpm, and will also greatly facilitate adjustments and changeovers.

Inspection systems

Even though it is usually fast and efficient, a canning operation is only as good as its monitoring system. The canning operation's accuracy depends on two main factors: that seaming equipment is operating correctly and inspection/detection systems for poor vacuum, incomplete fills and defective cans are operational.

The integrity of double seams is of vital importance in the canning process. With the speed and complexity of current equipment, visual inspection of random samples from the line is no longer acceptable to maintain a high quality product.

For this reason, new technologies have been developed for inspection on the line, one of which is Continental Can's *In-Line Double Seam Tightness Monitor*. The In-Line Monitor allows 100 percent monitoring of double seam tightness for every can before it leaves the closing machine with no effect on speed. An acceptable pressure range curve between the rolls and the chuck is selected, and the monitor matches the image of the actual pressure curve around the seam against the parameters in the software. The system alerts the operator of out-of-limits conditions through a status printer and monitor warning system. The removal

Major markets for metal food and beverage cans (Millions of dollars)

Year	Manufacturers' Sales of Metal cans	Annual Percent Change	Soft drinks, beer	Fruits, Vegetables, Juices	All other foods
1984	$11,621.4	10.1	7,640.6	1,743.7	2,128.4
1985E	12,667.1	9.0	8,463.5	1,975.6	2,228.0
1986E	13,304.6	5.0	8,810.0	2,090.2	2,404.4
1995P	25,120.0	7.0*	17,079.4	3,639.4	4,401.2

*Compounded Annual Average E – Estimate by BTA P – Projection by BTA
Source: U.S Department of Commerce; Business Trade Analysts

of questionable containers is accomplished by one of two optional integrated reject mechanisms.

The Double Seam Monitor is available as an option on new Continental Can rotary closing machines. It is also available as a retrofit for the existing 2000 Series.

Along the same lines, Dun-Rite Products, Barrington, IL, offers its *Double Seam Monitor System (DSM),* which performs single or double can end sampling anywhere within the can line system. As a can is transferred onto the DSM system, it is stabilized, metered and positioned through the sensing zone. The can is rotated three times in front of the sensing bar assembly and the double seam is sampled for defects. If the double seam qualifies, the can remains on the line. If it does not qualify, the can is ejected from the line for inspection.

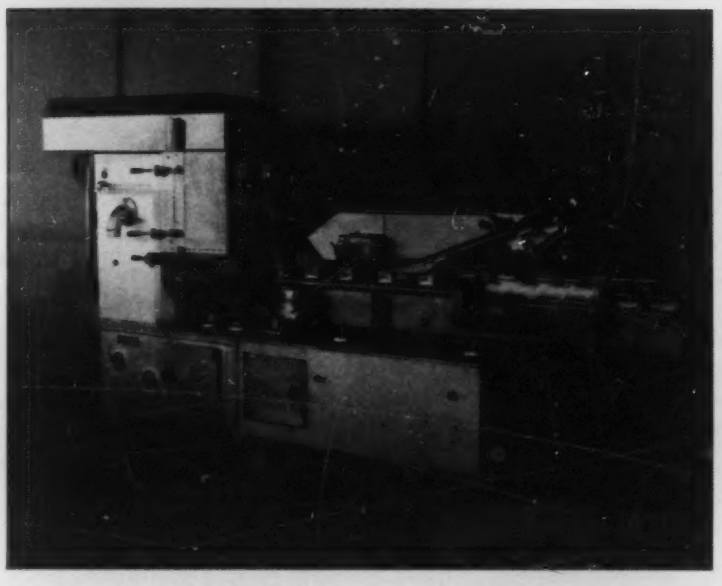
The DSM system can be incorporated into existing can lines for sampling of one or both double seams. The monitor system can sample up to 350 cpm. A built-in controller maintains proper can traffic on the line and Dun-Rite advises that cans should not idle on the DSM system.

Another form of on-line monitoring is vacuum inspection, which uses sensors to detect containers with poor vacuums. When a metal surface is stressed by vacuum, it is drawn into a concave shape. Greater vacuums will create greater degrees of concavity. These systems reject containers when the vacuum is insufficient to pull the can end inward beyond a threshold value locked in a sensing panel.

Key Technology, Walla Walla, WA, offers the *1200 Series of Dud Detectors*, which tests both ends of a can concurrently. Sensors located under the belt and in the top reference assembly measure can lid deflection and compare the readings to adjustable set points. Low vacuum cans and leakers are removed from the line at up to 1200 cpm.

Peco-Controls, Milpitas, CA, offers its *VAC-TRAC* dud-ejector system which checks each container for end-deflection by a three-point proximity sensing method. Each container passes under the sensor head, where outer sensors measure and average reference depth at the container's outermost edge. A middle sensor measures depth at the center on the container's end. Container end deflection is determined by subtracting the center-end measurement from the average signals on the outermost edge. The system has the capability to scan at 750 cpm.

An inspection system which is used on dedicated can lines from 202 size or greater is available from TapTone Container Inspection Systems, a division of Benthos, Inc., North Falmouth, MA. The *Standard Vacuum Profiler* uses a sensor to define a can end and can scan up to 1200 cpm. As a container passes under the sensor, a measurement is made defining the shape, or profile, of the container end and sensor output will vary according to the shape of the surface.



This vacuum seamer, model SHV 60, from Hema International, operates according to the double seam principle and can accommodate a wide range of containers.

In the case of a can end, the Profiler measures and responds to the degree of curvature of the end, which is electronically measured and compared with a preset "good" and "bad" profile. The system has a circuit concept which electronically stores these profiles. Assuming the production process is controlled, the curvature should remain consistent. If vacuum is lost, the curvature or the profile changes. A proportional readout indicates the degree of vacuum. The Profiler senses this profile change, and rejects the container with the defective profile.

Specialized systems

Inspection, however, is not just a matter of safety, and that is where a photoelectric sensor system, like that available from Omron Electronics, Schaumburg, IL, is ideal to check for proper can orientation. Omron's sensing system consists of a pulse-modulated infrared LED and special reflector and aspheric lenses. When used with a programmable controller, these sensors, the Omron *E3S-R* and *S3D8,* and the controller are able to detect upstream and downstream jams on the line. When the sensor detects the presence of cans, the PC uses internal timers to check if cans are not moving past the sensor at regular intervals (upstream jam) or are sitting still on the line (downstream jam).

The Angelus seamer, model 61H, provides high speed operation with semi-automatic lubrication to minimize downtime and maintenance costs.

The system will then reject or re-route the appropriate containers.

A new trend?

Are plastic cans the wave of the future in the canning industry? They may be, because, plastics have entered the canning marketplace bringing with them great capabilities.

Products packed in plastic containers are lighter in weight than their metal counterparts and are easily stored. They are microwaveable, which right now is a large plus. Presently, plastic containers are more expensive than metal cans but there is evidence that the cost gap is closing. It is believed, however, that small processors cannot afford a changeover to plastics until the price of the containers becomes at least comparable to metal.

The "Omni", for example, is a rigid plastic can developed by American National Can Company, Greenwich, CT. Composed of polyolefin, it is white, with one metal end where the seaming operation occurs. The container is retortable and has a high oxygen barrier, giving the packaged product a long shelf life. Probably the best consumer advantage of the container is that it is microwaveable. The container cannot be recycled but can be fully incinerated, giving off no harmful by-products.

According to American National Can, the Omni container can be used on any existing seaming equipment with some slight modifications. Currently, Hormel Co. is the only processor that is using the Omni can for its meat-based products. In addition, American National Can will be marketing several more Omni can applications in the first quarter of 1988. The containers will be both cylindrical and bowl-shaped.

The newest entry into the plastic can market, the Petainer, was developed by the Petainer Development Company, Atlanta, GA. It is currently being used for beverages in several test markets.

The Petainer can has a standard aluminum lid, is of low barrier layer construction, and has a PVC label. The container has a 15-16 week shelf life but cannot be used in a retort system. The Coca Cola Company had, until recently, test marketed the Petainer exclusively. Original New York Seltzer has since picked up on the use of the Petainer and has launched five of its ten flavored drinks in several test markets, two of which are Detroit and Boston. The container can be run on standard seaming equipment.

However, what if both ends of the can are plastic? We talked to Akerlund and Rausing, of Lund, Sweden, which has introduced its form of the plastic container into the Swedish market under the trade name *Letpak*.

Letpak is a three-piece container in which the can's case, lid and base are composed of polypropylene with a thin barrier lamination of aluminum. One end is sealed to the body by the manufacturer, the other is sealed at the point of fill. Inductive high-frequency welding gives the container a perfect seal.

According to Akerlund and Rausing, the container can be run on standard canning equipment with the addition of a special Letpak sealer. If magnetic conveyors are used on the line, they too must be changed. The line can run up to 200 cpm.

Presently three fruit products packed in the container have been test marketed in Sweden. Letpak has been developed for the worldwide market and will be widely available by 1990.

Here to stay

Most packaging authorities and forecasters will agree that the plastic can is here to stay. The advent of the plastics industry has forever changed the scope of packaging. It is interesting to note, though, the metal institutional can, number ten, has been untouched by the plastics market.

The plastic container is seen as a viable alternative to the metal can. However, this does not mean the end of metal cans—or the machinery to seam them. This machinery is adaptable, and with modifications, can seam metal-end plastic cans and all-plastic cans. It appears that conventional seaming equipment will not go obsolete—as long as a container has an end to be seamed.